

Syllabus for Descriptive Astronomy (Phys 191)

Spring 2009

Instructor information:

Name: Glenn Horton-Smith

Phone: 532-6476

Office: CW032B

Email: gahs@phys.ksu.edu

Hours: MW 11 AM-noon, or by appt.

Course objectives: This course is, as stated in the course catalog, “a survey of what is known about the [astronomical] universe and how it is known.” The knowledge you should strive to gain from your reading, lectures, and assignments is nothing less than a general idea of almost everything that’s “out there”: the qualities of space, the sun, the solar system, stars and galaxies, and so on, *and* how we know these things. The skills you should strive to develop are the ability to understand an astronomer’s description of an astronomical phenomenon or discovery, including both what the phenomenon or discovery is and how it was discovered, and the ability to connect that understanding with what you can see with your own eyes, whether unaided, or through a telescope, or in a photograph or other image.

Text: *Universe: Stars and Galaxies* (3rd edition), Roger A. Freedman and William J. Kaufman II.

Course website: Important course resources such as announcements, homework, grades, and answer keys will be posted on the course website, accessed through K-State Online. (I assume everyone knows how to use K-State Online. Please let me know right away if my assumption is incorrect.)

Individual help: Any student wanting individual help is welcome to see me during office hours, or at other times by appointment.

Grading: Please note that exams count for only 56% of your grade. Submitting answers to guide questions, giving correct answers to homework questions, and participating in at least one observing session are all important in this class.

<u>Point distribution</u>		<u>Final grade determination</u>	
Observing session(s):	140	900 or more	A
Homework (check questions):	150	800-899	B
Homework (guide questions):	150	700-799	C
Exam #1:	120	600-699	D
Exam #2:	120	599 or less	F
Exam #3:	120		
<u>Final Exam:</u>	<u>200</u>		
Total:	1000		

Observing session(s): Members of the North Central Kansas Astronomical Society (NCKAS) hold occasional public viewing sessions at one of several nearby “dark sky” sites. This is a great thing! There are four public sessions currently scheduled, all on moonless Saturday nights, but NCKAS has kindly agreed to arrange for special sessions on other nights if there is enough interest. The class will be polled about this. This is your opportunity to practice connecting what you will learn in class with what you can see with your own eyes.

Participation in at least one observing session is required and counts for 14% of your grade. (You are welcome to attend as many sessions as you like.)

See the “events” page at <http://www.nckas.org/> for the current schedule of public viewing sessions (and other neat stuff).

Homework: Homework is due every Monday. Feel free to finish the homework on Friday if you like. There are 15 assignments this term. Each assignment is worth 10 points. Homework questions are distributed to you through the course website on K-State Online. There are two parts to each homework assignment:

- **Check questions:** These are questions about material that we have *already* covered. The point of these questions is to make you think more about what we studied and make sure you understand it. *Accuracy of your answers is what determines your grade on these questions.* You are permitted to work with (but not to copy from!) other students on homework assignments, provided you acknowledge such cooperation by writing “I worked with ...” in the “comment” field of the online assignment.
- **Guide questions:** These are conceptual questions about the material we are *about* to study. These questions will be similar to the “Questions to Guide Your Reading” in the textbook. *Any good faith attempt to give thoughtful responses to all the questions will receive full credit.* Your responses provide me “Answers to Guide the Lectures.” Short and thoughtful responses are preferred. Feel free to include questions in your responses.

Exams: There will be three examinations during the term and one final. Makeup exams will be given only in special circumstances. The exams are given in class on the days shown on the schedule. The final exam is comprehensive, with some emphasis on the material covered in the final weeks of instruction, but relying on material from the entire course. The exams will be similar (not identical) to the homework, except that you will record your answers on Scantron cards instead of on-line, and no books or notes can be used in the exams.

Standard statements for K-State syllabi:

Students with Disabilities: Any student who needs an accommodation or other assistance in this course should speak with me as soon as possible.

The Official Statement Regarding Academic Honesty:

“Kansas State University has an Honor & Integrity System based on personal integrity, which is presumed to be sufficient assurance in academic matters one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor & Integrity System. The policies and procedures of the Honor & Integrity System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The honor system web site can be reach[ed] via the following URL: www.ksu.edu/honor .

“A component vital to the Honor System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: 'On my honor, as a student, I have neither given nor received unauthorized aid on this academic work.' A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.”

To understand what aid is and is not authorized in this class, please read carefully the “Homework” and “Exams” sections above. If anything is unclear about the course policies, the Honor System, the Honor Pledge, the concept of “unauthorized aid”, or anything else, please talk to me about it right away.

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Schedule

Week	Date	Topics	Reading
1	Thu 1/15	Introduction; What is science?	Ch 1
2	Tue 1/20	Angles, distances, powers of ten; The science of astronomy	
	Thu 1/22	What first meets the eye: naked eye astronomy	Ch 2
3	Tue 1/27	Celestial coordinates; Seasons, cycles, and time	
	Thu 1/29	Shadows in the sky; Measuring the earth, sun, and moon the same way a good roofer plans a job (trigonometry)	Ch 3
4	Tue 2/3	The motions of the planets	
	Thu 2/5	Laws of motion and gravity	Ch 4
5	Tue 2/10	EXAM #1 (in class): Gravity, motion, time, and geometry review	
	Thu 2/12	What we know about light I	Ch 5
6	Tue 2/17	What we know about light II	
	Thu 2/19	About telescopes; Better eyes: photography and spectroscopy	Ch 6
7	Tue 2/24	Different eyes: Radio telescopes	
	Thu 2/26	Eyes from other sciences: "Nuclear astronomy" and the solar system	Ch 8 [or 7&8]
8	Tue 3/3	Origin and development of solar system(s), extrasolar planets	
	Thu 3/5	Why does the sun stay hot? A model of the sun	Ch 16
9	Tue 3/10	EXAM #2 (in class): Sun, planets, telescopes, and light review	
	Thu 3/12	What we know about stars I	Ch 17
A	Tue 3/17	<i>(spring break)</i>	
	Thu 3/19	<i>(spring break)</i>	
10	Tue 3/24	What we know about stars II; Nuclear astronomy and the heavy elements	Ch 20 [or 17-20]
	Thu 3/26	Supernovae; Very different eyes: Neutrino astronomy	
11	Tue 3/31	Special theory of relativity	Ch 22
	Thu 4/2	General theory of relativity; Black holes	
12	Tue 4/7	What we know about our galaxy	Ch 23
	Thu 4/9	EXAM #3 (in class): Our galaxy, relativity, nuclear astronomy, and stars review	

Schedule

- 13 Tue 4/14 What we know about other galaxies Ch 24 [or 24-25]
 Thu 4/16 More about our galaxy and other galaxies
- 14 Tue 4/21 The distance ladder, the Hubble Law, and large Ch 26
 scale structure
 Thu 4/23 Olber's paradox: how can the sky stay dark?;
 The Big Bang (and how we can still see it)
- 15 Tue 4/28 High precision measurements as a grand new Ch 27
 eye: the shape and content of the entire
 universe
 Thu 4/30 What we know about the early universe and
 what has happened since then
- 16 Tue 5/5 Search for extraterrestrial life and intelligence Ch 28
 Thu 5/7 General Q&A

Wed 5/13 FINAL EXAM 2:00-3:50 PM